

The goal of this homework is to get you familiar with Matlab. You are to implement some on-line learning algorithms and plot various performance curves.

Base task:

Implement the disk idle time prediction algorithms given in original paper (see link for Lecture 6).

Plot the total energy usage of the master algorithm, the individual experts, and the optimal algorithm.

Plot the weights of the experts over time.

Summarize your results in a short report. In particular carefully describe you plots and brainstorm on how to extend your algorithms.

Besides the base task you should do at least one of the following:

- Study the effects of using different sets of fixed time outs as experts and different learning rates
- Study the effects of different loss functions. In the paper they scale the loss or excess loss by the spindown cost. What happens if you omit this scaling?
- Try different share updates (Fixed share to start vector / fixed share to uniform past /fixed share to decaying past / variable share updates). What about the entropic versions of these updates?
- In the original paper each expert is a fixed time out strategy. Use other simple rules of thumbs as experts
- Make up artificial data sets (As in the [BW] paper) to study the effects of different share updates
- Any other idea you might have

Be sure to visualize your results and remember, presentation is what counts.

The data (use Cello 1 for the homework) is accessible via a link of the webpage. We also provided some good initial parameter settings for your algorithms.

Begin by reading the original Spin Down paper and "Shifting Expert's" papers as much as possible.